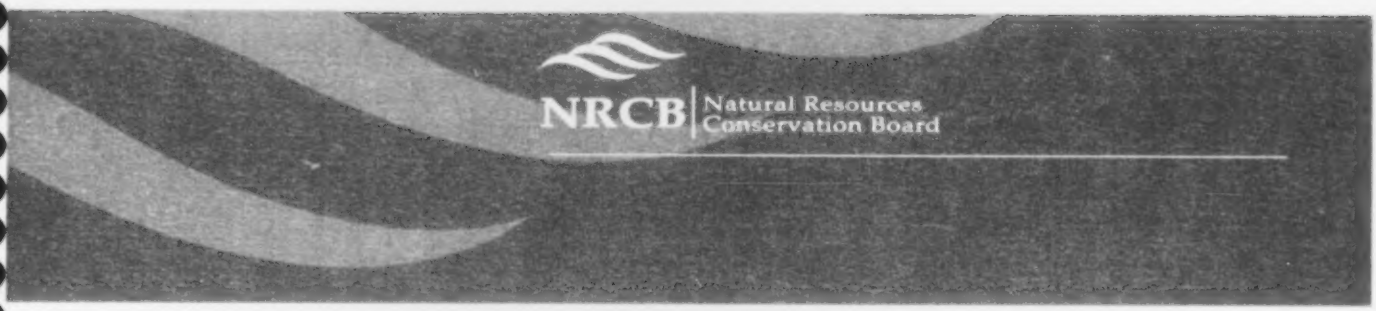

BOARD DECISION NR 2008-02
NRCB Application No. 0701

Arclin Canada Ltd.
Formaldehyde Production Plant, Sexsmith

September 2008

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SECTION 1: INTRODUCTION

1.1: Application to the NRCB

On the recommendation of the Minister of Environment, the Lieutenant Governor in Council prescribed the formaldehyde manufacturing plant to be located in Sexsmith, Alberta and proposed by Dynea Canada Ltd. as a reviewable project pursuant to Section 4(f) of the *Natural Resources Conservation Board Act* (the Act). Order in Council 449/2006 was signed by the Lieutenant Governor on September 27, 2006.

The Act provides that the Natural Resources Conservation Board ("NRCB" or "Board") was created *"...to provide for an impartial process to review projects that will or may affect the natural resources of Alberta in order to determine whether, in the Board's opinion, the projects are in the public interest, having regard to the social and economic effects of the projects and the effect of the projects on the environment."* The Act prohibits the commencement of a reviewable project unless the NRCB, on application, has granted an approval for the project.

On April 2, 2007 Dynea Canada Ltd. filed an application for a 60,000 tonnes/year formaldehyde production facility (the project) to be located in the Town of Sexsmith, Alberta. The formaldehyde production facility is the third phase of an industrial operation that will primarily be used to produce resins for the regional oriented strand board, plywood, and medium density fiberboard markets and to supply a resin facility owned by the same company in Kamloops, British Columbia. Phases I (bulk storage and reloading facilities) and II (resin production facilities) of the Sexsmith operation did not require an environmental impact assessment or approval from the NRCB.

In July 2007 all of the assets of Dynea Canada Ltd. were acquired by Teachers' Private Capital, the private investment arm of the Ontario Teachers' Pension Plan and were renamed Arclin Canada Ltd. ("Arclin" or the "applicant"). Arclin is based in Mississauga, Ontario and operates 15 facilities with approximately 700 employees in Canada, the United States and Mexico.

1.2: Scope of Review

The Board has reviewed the application to construct and operate the project and is satisfied that the application materials provide sufficient information to assess the environmental, social and economic effects from the construction and operation of the formaldehyde production facility in the Town of Sexsmith. The Arclin application to the Board is limited to Phase III (formaldehyde plant) of the Arclin facilities at the site. In the event that the formaldehyde plant does not receive Board approval or is not constructed, Phases I and II of the Arclin facilities will operate with formaldehyde transported to the site rather than having it manufactured on site. This aspect is important as it establishes the baseline by which the Board will assess the project.

1.3: Review Process

The applicant filed an application with the NRCB on April 2, 2007. The Board and Alberta Environment issued a Joint Notice dated May 18, 2007 advising that the application had been filed with the NRCB and that an environmental impact assessment (EIA) had been submitted to

Alberta Environment and that the application materials were available for review at various locations near the proposed project location as well as at the NRCB and Alberta Environment Edmonton offices. This Notice was published in the Grande Prairie Daily Herald Tribune on May 18, 2007 and was delivered by Canada Post Admail to all Sexsmith postal boxes.

The NRCB and Alberta Environment (with input from associated government agencies) conducted independent reviews of the filed materials and developed a consolidated supplemental information request (SIR). The SIR was sent to Arclin on October 5, 2007 followed by a further request for supplemental information by Alberta Environment on December 19, 2007. The information requested was determined necessary to complete the statutory mandates of the NRCB and Alberta Environment. Arclin filed responses to the requested information on November 2, 2007 and January 2, 2008. During its review, the Board requested further details from the applicant by letters dated July 3 and 21, 2008. Arclin responded on July 16, 30 and 31, thereby completing its application to the Board.

The NRCB review process is one component of a broader review process that provides for public involvement at various stages. Following public notice calling for statements of concern from interested persons, the NRCB determined that the review of this project had the potential to be completed without the need for a public hearing. Inherent in the assessment was the understanding that the affected public was made aware of the project, and had an adequate opportunity to familiarize themselves with potential project effects and to identify any potential concerns.

Alberta Environment plays a key role in the NRCB review process through its participation in the applicant's development of the EIA report that generates the majority of information contained in the application. Alberta Environment's involvement occurs during the development of the EIA terms of reference, the review of the EIA in terms of completeness, and participation in any NRCB hearing. In overseeing the EIA process, Alberta Environment also invites other government departments to participate to ensure the completeness of the EIA. For example, Alberta Health has provided input on issues related to human health. Alberta Environment also has a significant role in relation to an NRCB approval. Section 9 of the Act provides that the Board may grant an approval on any terms and conditions that it considers appropriate and particularly in those circumstances where a need is identified to achieve certain objectives. The rationale for any terms and conditions is to be set out clearly in the Board's decision.

A review under the Act differs from many statutory regulatory schemes in that the Board does not have an ongoing role in the regulation of the project. As a result, the ongoing review and enforcement of conditions included in a NRCB approval under the Act is normally delegated to a provincial department that has an ongoing regulatory function. The Board is careful to identify the appropriate delegate, most commonly Alberta Environment, to oversee the successful implementation of those conditions.

In assessing the impact associated with the project, the Board has regard for the regulatory environment governing associated activities. For example, in this review, Alberta Employment and Immigration ensures compliance with the *Occupational Health and Safety Act* and associated regulations. In obtaining an understanding of the regulatory controls in place, the Board believes it is also in a better position to understand the potential of the operation to affect both the workforce and those who may find themselves on the site of the operation.

After consulting with Alberta Environment concerning the completeness of the EIA and completing its own review, the Board issued a Notice of Application dated January 18, 2008 and published this notice in the Grande Prairie Daily Herald Tribune on January 18, 2008. Section 8 of the Act provides that the Board is required to hold a public hearing only if it receives a bona fide objection from a directly affected individual or group of individuals. In response to its Notice of Application the Board received five objections. The Board requested additional information from each of those parties in letters dated March 26, 2008 as it could not determine whether the individuals filing the objections were directly affected by the project. Only one of the parties that received the Board's March 26, 2008 letter responded. Based on a review of the materials provided by the parties, the Board determined that none of the parties submitting objections had satisfied the Board that it would be directly affected by the project. Accordingly, the Board decided to render a decision without holding a public hearing.

1.4: Public Consultation

In 2002 the applicant held a series of meetings with the Town of Sexsmith in the early stages of project development. This was followed by town hall meetings in Sexsmith that were held in November 2005 and May 2006 as well as an open house in October 2006. The applicant directly approached adjacent landowners and residents of Sexsmith, the Horse Lake First Nation, Duncan's First Nation, Peace AirShed Zone Association, the Town of Sexsmith, local industry and utility providers. The process used to communicate with and solicit input from stakeholders included mail-outs, meetings, news releases, site tours and home visits.

The overall intent of NRCB expectations for public consultation is to ensure that an applicant discloses its project to interested and potentially adversely affected parties. It therefore allows the parties an opportunity to understand the proposed project, identify and discuss concerns, and identify areas of difference for which they might be unable to find suitable solutions. This provides an opportunity for the applicant to build relationships with stakeholders and possibly accommodate their interests. These actions may in turn build trust and constructive future relationships between an operator and stakeholders.

The Board is satisfied that the applicant conducted an adequate consultation process with all potentially affected parties. Arclin also committed to establish an ongoing Community Awareness and Advisory Committee should it receive an approval.

SECTION 2: BASELINE FOR IMPACT ASSESSMENT

As discussed in Section 1.2 of this report the scope of review for the Board is limited to the Phase III component of the Arclin facilities in Sexsmith. In establishing a baseline for this review the Board accepts that the initial two phases of the Arclin facilities can be operated without Phase III in place by using rail transport to move formaldehyde from its Thunder Bay production facility.

In assessing the social, economic and environmental effects of the project, the Board must determine the incremental effects associated with Phase III. While in most cases the application materials identify and isolate the effects in a manner that makes the task of

understanding the effects associated with Phase III relatively straightforward, portions of the application do not clearly delineate the Phase III effects from the total facility effects. Where such effects are not clearly distinguished from the overall effects from the Arclin Sexsmith facilities the Board must apportion such effects between the reviewable project and the pre-existing facilities in a reasonable manner.

In attributing effects that are not clearly limited to Phase III the Board believes that it should take a conservative approach. For those effects that would largely be viewed as having a negative effect on the public interest this would mean that the Board would assume that those effects are associated with Phase III unless there is clear information attributing those effects to the other facility components. For those effects that are largely positive public interest test considerations, a conservative approach would suggest that the Board must find a direct connection with the Phase III facility. Where necessary, this approach may require the Board to make determinations that appropriately attribute a portion of the effects associated with the entire Arclin Sexsmith facility to the reviewable project. Such an approach assures that the Board has regard for both the positive and adverse effects associated with the project without either overvaluating positive impacts or discounting adverse effects. While the application materials filed by the proponent pertinent to Phases I and II are important for the Board to have an understanding of both the total operation and the relationship of Phase III to those facilities, the mandate of the Board is restricted to an assessment as to whether Phase III satisfies the public interest test.

Where appropriate, the Board will also have regard for the cumulative effects associated with the Arclin facilities to assure that any determination it may reach with respect to the public interest on Phase III is made with an understanding of the relevant cumulative effects on the community, region and the province.

SECTION 3: PROJECT NEED AND JUSTIFICATION

3.1: Socio-Economic

Views of the Applicant

Arclin's view was that the population of the Regional Study Area (RSA) should not be greatly affected by the construction and operation of Phase III (formaldehyde plant) for the following reasons:

- Because the construction of the formaldehyde plant will follow construction of the resin plant, there will be no incremental change to the number of construction workers already on-site. Rather, the total time that these temporary workers spend in the RSA will be extended by an estimated eight to ten months.
- Operation of the formaldehyde plant requires only eight additional employees.

Arclin stated that local residents will not be adversely impacted by environmental issues stemming from the Phase II resin plant or the Phase III formaldehyde plant because air and water quality are expected to remain within acceptable limits and there will be no unacceptable noise, traffic or visual effects resulting from the project. In addition, it was Arclin's view that local

infrastructure and community services needs will not be affected since effects on population are considered negligible.

Arclin indicated that the project will generate the following economic benefits for the local and provincial economies:

- Increased home values in Sexsmith
- Capital expenditures of $26 million and $11 million on the resin plant and formaldehyde plant, respectively
- The creation of up to 38 direct permanent jobs (eight of which are attributed to the formaldehyde plant) and as many as 30 indirect permanent jobs relating to both the resin and the formaldehyde plant. These new permanent jobs will provide employment and training opportunities for local residents.
- An unquantified amount of corporate and personal income tax
- Other unquantified spin-off benefits for local businesses relating to local procurement

Arclin referenced the significant population increases in the Town of Sexsmith, which showed an average growth of 11.6 percent from 1996 to 2001. The population in Sexsmith grew from 1,653 in 2001 to 1,934 (estimated) in 2005.

Views of the Board

As stated in the introduction, the Board's decision is limited to Phase III of this project. However, since cumulative effects are part of the review process, the Board's views take into consideration the entire project but from a cumulative perspective only. The socio-economic impacts of Phase III are to the extent possible evaluated separately and discussed as a 'stand-alone' project.

The Board accepts that the operational phase of both the resin and the formaldehyde plants will create up to 38 new permanent jobs with eight new jobs attributable to Phase III. The Board also accepts that the economic spin-off created by the operation of the entire plant will generate in excess of 30 additional jobs in the transportation and service industries.

The Board believes that new jobs generated by the resin and formaldehyde plants should attract new residents to Sexsmith. At the same time, the many individuals who commute to work outside of town may view the new plant as an opportunity to find work locally. Given that the Board is reviewing Phase III only, it considers the addition of eight new jobs associated with the formaldehyde plant to be an incremental increase over Phases I and II of the project, and a net benefit to the region.

The Applicant did not address the baseline state of infrastructure and services within the RSA. Rather, it stated that: "*the project should have no impact on the local infrastructure and community services.*" Overall, the Board finds that the project will have positive economic impacts in the local area, given the projected growth of jobs and associated spin-off benefits. Given this growth, the Board also assumes that there will be some additional requirements on local infrastructure and community services. The Board views these additional pressures as

out-weighed by the additional economic activity and generation of taxes to local municipalities. This is supported by the limited local opposition to the project and support given by the Town of Sexsmith.

The Board feels that the addition of the formaldehyde plant will likely add to the long-term economic sustainability of the Arclin operation at Sexsmith. Eliminating reliance on an out-sourced input such as formaldehyde may provide improved cost control, assurance of supply and reduced input costs. These would ultimately add to the long-term viability of the plant, job security for workers and a more predictable tax base for the municipality.

3.2: Operational Issues

Arclin proposed to construct a unit to manufacture formaldehyde which is a raw material for the existing resin plant. In the process, methanol is converted to formaldehyde in the presence of air (oxygen) and a silver catalyst. The produced formaldehyde gas mixture from the catalyst converter is fed to an absorber column with process water to form a formalin solution. In the existing resin plant, the formalin solution is combined in the resin kettles with urea or phenol along with caustic and other minor raw materials to produce various grades of urea-formaldehyde resin and phenol-formaldehyde resin.

Views of the Applicant

Arclin indicated that the major equipment for the formaldehyde plant, which includes the air scrubber, vaporizer, catalyst converter and absorber tower, will be designed:

- based on best practice
- in accordance with latest regulatory and industry standards. All pressure vessels and pressure piping systems will be registered with the Alberta Boiler Safety Association (ABSA). Applicable fuel storage tanks have been registered with the Petroleum Tank Management Association of Alberta.

Arclin considered the silver catalyst process and the metal oxide (iron oxide, molybdenum, vanadium) catalyst process for formaldehyde production. Even though metal oxide catalyst technology has been more common historically, Arclin elected to use the silver catalyst technology for the following reasons:

- lower initial capital costs
- improved product quality
- lower electricity consumption
- higher production levels of heat byproduct
- lower catalyst costs

Views of the Board

The Board concurs with the use of the silver catalyst process for the production of formaldehyde. Given the economics of production, higher energy efficiency and potential for by-product heat utilization, the Board agrees that the selected process is a sound choice.

The applicant has indicated that current market conditions for its resin product are not favorable and the plant will delay start-up. Plant start-up is expected to occur once market conditions for wood and in particular plywood and chipboards are more favorable. It is difficult to predict when improvement in market conditions for wood products and therefore resins will occur.

While silver and metal oxide catalysts for formaldehyde production have been used the longest, the Board believes that newer technologies, should they become reliable and cost-effective, should be evaluated. For example there are a variety of resin and adhesive products under development that do not use or are not reliant on formaldehyde. Bio-based and environmentally friendly approaches to resin and glues, while not currently economically viable on a commercial scale, may become more attractive in the future. Depending on the length of time that passes before plant start-up, the Board believes there is merit in considering alternative approaches to resin production.

The Board notes that continuous improvement is promoted in the *Environmental Protection and Enhancement Act* (*EPEA*) through Alberta Environment (AENV) approvals and policies. **The Board recommends that the applicant keep abreast of new technologies for their potential to replace formaldehyde based processes in the production of resins.**

SECTION 4: ENVIRONMENTAL ISSUES

4.1: Air Quality, Monitoring and Noise

4.1.1: Air Quality

Views of the Applicant

Arclin concluded that the formaldehyde plant absorber would be the only source of potential air emissions from the formaldehyde plant, with all emissions from the formaldehyde plant absorber vented through the thermal oxidizer (TO) exhaust. For the cumulative case, any potential air emissions would be from the resin production plant, the tank vents, the boiler steam vents and the bulk solids handling, all of which would be vented through the regenerative thermal oxidizer (RTO) exhaust. Arclin did not identify any other emission sources that would contribute to the cumulative case other than the formaldehyde plant.

According to Arclin, the emissions that are expected to be generated from the formaldehyde plant are formaldehyde, carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxide (NO_x) and volatile organic compounds (VOC) /methanol. The additional emissions that are expected to be generated from the cumulative case are urea, phenol, sulphur oxide (SO_2), and particulate matter less than 10 µm (PM_{10}). Arclin indicated that it will implement a fugitive emissions control and detection program in accordance with applicable sections of the Canadian Council of Ministers of the Environment (CCME) Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions (1993).

Arclin indicated that it will utilize the following emission control equipment:

- Incineration of VOC's (minimum 95 percent efficiency) with a thermal oxidizer for the formaldehyde plant
- Incineration of VOC's (minimum 95 percent efficiency) with a regenerative thermal oxidizer for the cumulative case
- Filtration of dust (bag filter) from the urea storage hoppers for the cumulative case

Arclin employed the following approach and data sources in the prediction of ground level concentrations of the identified emissions:

- ISC-AERMOD air dispersion model (screening) was used to calculate ground level concentrations from multiple emission sources
- Three emission sources were modeled: TO exhaust, RTO exhaust and the boiler steam vent; destruction efficiency from the TO and RTO was assumed to be 95 percent
- Existing operating data from other Arclin facilities and engineering calculations were used for input for emission data; conservative inputs were used in all cases possible; a maximum emission (rather than average) scenario was assumed for each contaminant
- Meteorological data were obtained from the AENV station at Peace River for the 1990 year because Arclin felt this represented a typical year and the data were in a format that was acceptable for the model
- Data on the proposed buildings were input into the model to account for any downwash

Arclin concluded that the formaldehyde emission rate will increase from 0.0035 kg/hr to 0.041472 kg/hr with the addition of the formaldehyde plant.

Arclin provided Table 1 which summarizes and illustrates the results of the ground level concentrations modeled for the cumulative case. According to Table 1, the maximum one hour concentration of all contaminants will remain below the limit of Alberta Ambient Air Quality Objective (AAAQO) criteria within the plant boundary.

Contaminant	Total Emission Rate (g/s)	Maximum Ground Level Concentration ($\mu g/m^3$)	AAAQO Limit ($\mu g/m^3$)
Formaldehyde	0.01152	1.11727	65
Urea	0.0012	0.34211	Not specified
Phenol	0.00224	0.63975	100
CO	3.713106	1191.2627	15,000
CO_2	404.79545	46746.17188	Not specified
SO_x (as SO_2)	0.00321	4.1137	450
NO_x (as NO_2)	0.144713	126.732	400
PM 10	0.03214	0.1912	50[1]
VOC/Methanol	0.01736	1.52431	2600

[1] This is a BCAQO limit as there is no Alberta objective.

Table 1: Comparison of one hour maximum ground level concentrations of contaminants of potential concern to Alberta Ambient Air Quality Objectives, adapted from Arclin's SIR response to question 34, "Emission Summary Table for Cumulative Case."

Arclin stated that the air modeling was conducted for the worst case scenario for the cumulative model, which assumed the boiler was online. Arclin indicated that, in actuality, the whole plant will emit less NO_x than the Phase II resin plant as the gas-fired boiler will be offline.

Arclin concluded that no odourous emissions from the formaldehyde plant or cumulative case will be detected past the fenceline.

Arclin reported that there is a by-pass vent on the thermal oxidizer which will only be used immediately prior to a shut-down of the TO due to a malfunction or for maintenance. It indicated that for maintenance, the maximum downtime of the TO is four hours and the maximum monthly downtime of the TO is 12 hours. Arclin concluded that under no circumstances (even during TO downtime) will facility wide emissions exceed the maximum ground level concentration limitations as set forth in its approval.

Views of the Board

The Board agrees that Arclin used the best available data (in a conservative manner) to conduct modeling to determine the predicted ground level concentrations of air emissions. The Board also agrees that the modeled maximum ground level concentration of formaldehyde and all other air emissions will be well under the Alberta Ambient Air Quality Objectives. However, it also believes that the results from dispersion modeling is accurate only to the extent that assumptions made are correct and all the emissions are captured and exhausted through the TO. The Board notes that Arclin has not predicted what the fugitive emissions from the formaldehyde plant and cumulative case might be, but did commit to implementing a fugitive emissions control and detection program in accordance with applicable sections of the CCME Environmental Code of Practice for the Measurement and

Control of Fugitive VOC Emissions (1993). **The Board requires as a condition that Arclin implement a fugitive emissions control and detection program in accordance with applicable sections of the CCME Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions (1993) or with the latest updates, to the satisfaction of Alberta Environment.**

The Board understands that for maintenance purposes, the TO needs to be shut down regularly, but for efficiency the plant will not be shut down at the same time. The Board notes that Arclin has committed to a maximum daily downtime of the TO of 4 hrs and a maximum monthly downtime of the TO of 12 hrs. The Board also notes that during TO downtime, Arclin committed that facility wide emissions would not exceed the maximum ground level concentration limitations as set forth in its approval.

The Board therefore requires as a condition that the maximum ground level concentrations at the facility should not exceed Alberta's Ambient Air Quality Objectives at all times, including downtime, and any exceedances must be reported to Alberta Environment for appropriate follow-up.

4.1.2: Monitoring

Views of the Applicant

For the formaldehyde plant, Arclin proposed to conduct continuous temperature monitoring of the TO and to monitor annually for formaldehyde and phenol emissions at the TO exhaust according to the same terms and conditions in the previously granted Industrial Applications Approval for the Phase II resin plant.

For the cumulative case Arclin is required to conduct continuous temperature monitoring of the RTO and annual monitoring for formaldehyde and phenol at the RTO exhaust according to its Alberta Environment Approval. Arclin indicated it will also conduct ambient monitoring according to the approved ambient air monitoring proposal.

Arclin's approved ambient air monitoring proposal for Phases I and II indicated that it will operate four ambient air monitoring stations: upwind on the southwest property boundary fenceline, centre of the northern property boundary fenceline, downwind on the northern section of the eastern fenceline, and north of the property near the elementary school. Arclin proposed to conduct continuous 30-day samples for NO_2, SO_2 and PM_{10} and continuous 24-hour samples for formaldehyde, phenol, CO and CO_2. Arclin proposed to conduct the initial sampling within six months of resin plant operation start-up and semi-annually thereafter for two years. Arclin proposed to conduct the 30-day sampling once and the 24-hour sampling twice during each semi-annual event. In a letter to the Board dated July 16, 2008, Arclin indicated that it would amend the current ambient air monitoring plan for the formaldehyde plant to include VOC (as methanol). It did not envision the need to supplement the current number of monitoring stations or alter their proposed locations.

Arclin indicated that it will be relevant and important to monitor plant emissions in the early stages of operation while processes are being optimized. Elsewhere in the application it

proposed to monitor plant emissions during the initial stage after commencing production and annually thereafter.

In addition to the approved ambient air monitoring plan and the requirements of its previous approval, Arclin indicated that it will continue to monitor and assess air quality and effectiveness of mitigation through active participation in the Peace AirShed Zone Association. Arclin indicated it will not be conducting any additional monitoring for contaminants that are not specified in its operating approvals.

Arclin indicated that it will comply with the *Canadian Environmental Protection Act*'s National Pollutant Release Inventory requirements for formaldehyde, phenol and urea.

Views of the Board

The Board agrees that the plans for the proposed stack monitoring of emissions are sufficient for the formaldehyde plant.

As the ambient air dispersion modeling is based on data that are not necessarily site specific and the modeling results are only as good as the assumptions made, the Board believes that early validation of the ambient conditions is necessary.

The Board requires as a condition that Arclin conduct ambient air monitoring every two months for the first six months of operation of the formaldehyde plant and that the results be reported to Alberta Environment.

The Board sees value in Arclin's participation as an active member of the Peace AirShed Zone Association (PASZA) and recommends that it maintain active participation.

4.1.3: Climate Change

Views of the Applicant

Arclin concluded that greenhouse gas emissions (GHG) for the cumulative case are attributable primarily to the emission of CO_2 from the burning of natural gas as fuel to the boiler, RTO and TO units. In response to SIR question 40, Arclin indicated that the total expected GHG emissions from the operation are 11,653 tonnes/year for the cumulative case. It indicated that these emissions represent a 0.00496 percent contribution to the provincial GHG inventory which was estimated to be 235 megatonnes in 2004.

Views of the Board

The Board agrees that the greenhouse gas contribution from the cumulative case will be minimal.

4.1.4: Noise

Views of the Applicant

Arclin did not evaluate the noise impact from the formaldehyde plant alone. Arclin concluded that the sources of noise from the cumulative case include four formalin plant blowers, two cooling towers, an emergency electrical diesel generator and numerous pumps. Arclin did not conduct any noise impact assessments for the proposed operation, but it indicated that an acoustic assessment conducted on its Thunder Bay facility concluded that both non-impulsive and impulsive sound levels of the facility complied with the applicable sound level criteria at all hours of the day, evening and night under typical predicable worst case operating conditions. Arclin therefore concluded that the cumulative case would operate with a baseline operational noise level of 45 decibels at night and 55 decibels during the day. Arclin indicated that equipment specification for the Sexsmith site will ensure that no adverse impact will occur and that attenuation will be provided on all noisy equipment.

Views of the Board

The Board understands that it is difficult to predict the noise impact from the formaldehyde plant and cumulative case before the plant is in operation. The Board agrees that the formaldehyde plant likely will not have any adverse impact on the community in terms of noise, but also understands that noise levels are required to remain under levels accepted under municipal bylaws. **The Board recommends that noise levels be mitigated to the maximum levels committed to in Arclin's application of 45 decibels at night and 55 decibels during the day at the fenceline.**

4.2: Site Reclamation and Traffic

4.2.1: Site Reclamation

Views of the Applicant

Arclin reported that Phases I to III of the proposed industrial development at Sexsmith are to be located in the NE1/4-24-73-6-W6, land formerly occupied by Northern Lite Canola Inc. Arclin stated that several environmental site assessments (ESA) have been conducted and completed, following the shut-down of operations by Northern Lite Canola Inc. in 1996. Arclin noted that Thurber Environmental (1994) assessed the hydrogeology and soils of the plant site. Arclin reported that Clifton Associates Ltd. (1999) completed a Phase I ESA of the plant site and Komex International Ltd. (2001) conducted a geophysical investigation of this site. As part of the Northern Lite Canola Inc. plant decommissioning and clean-up process, Arclin said that Nichols Environmental (2001) completed a Phase II ESA of the industrial site. Arclin indicated that Nichols Environmental managed the clean-up of the industrial site and conducted a site survey in 2006.

Arclin indicated that the consultants' reports, documenting the assessment, decommissioning, remediation and clean-up completed at the former Northern Lite Inc. site for the Town of Sexsmith, have been reviewed and accepted by Alberta Environment. Arclin

stated that Alberta Environment formally acknowledged, in 2002, that the site had been remediated to meet CCME Commercial/Industrial criteria.

Arclin noted that the Town of Sexsmith had purchased land, located along the eastern boundary of its site, to allow for the development of a road to access a future new industrial/residential subdivision to be located south of Arclin's property. Arclin said that the Town of Sexsmith had also drained, backfilled and disposed of the sludge from the two industrial storage ponds included in this land purchase. Alberta Environment confirmed that the remedial work, completed in this regard, met regulatory requirements.

Arclin said that, following the remediation and reclamation work successfully completed by the Town of Sexsmith on the storage ponds included in its land purchase, two additional storage lagoons remained at this location. Arclin indicated that, while the remaining lined storage pond would be decommissioned and backfilled, the unlined pond would be retained and used to store fresh water for fire-fighting purposes.

Arclin reported that extensive re-contouring of the former Northern Lite Inc. site had been completed to meet development requirements for the planned Phases I to III facilities. Arclin explained that high topographic areas of the site had been re-graded and low areas were built up to meet planned geotechnical specifications. Arclin said that the low topographic setting of the central area of the site was filled so that buildings would be at a slightly higher elevation than the existing rail line. Similarly, Arclin indicated that roadways were built up to match the rail line elevation. Arclin noted, in places, the re-contouring involved fill to a depth of approximately 1.5m above existing surface grade.

Arclin stated that site preparation for the Phases I to III facilities also involved re-location of a part of the existing waste canola meal land farm located south of the rail line. Arclin stated that an area of 19,748 m^2 of a total land farm area of 41,898 m^2, located in the south part of the property, was removed and the waste canola meal stockpiled along the southern boundary of the Arclin property. Arclin reported that the waste canola stockpile area has been bermed and that the area has also been ditched to manage surface water flow. Arclin acknowledged that neither the ongoing treatment nor the final disposition of the relocated waste canola meal would likely be addressed before 2010 when the land farm permit, formerly held by the Town of Sexsmith, is due to expire. Arclin confirmed that it had assumed responsibility for interim management and final disposition of the excavated and stockpiled waste canola meal. Arclin indicated that, following discussions with Alberta Environment, one of the options favored for final disposition of the stockpiled waste canola meal may be off-site disposal at a licensed waste facility.

Views of the Board

The Board acknowledges the formal decision by AENV that concludes the soils and groundwater at the former Northern Lite Canola Inc. industrial site have been cleaned up to meet CCME commercial/industrial land-use criteria, a regulatory standard in Alberta. The Board accepts this status of soil and groundwater quality for the plant development area, as the baseline case for Arclin's current application.

The Board notes that the waste canola meal stockpile, currently located along the southern boundary of Arclin's property, has resulted directly from re-contouring of the industrial site and the relocation of an existing land farm, in preparation for Phases I to III of plant construction. The Board believes that, without specific monitoring and mitigation measures, the leachate generated from the waste stockpile may negatively impact the quality of surface water and the shallow groundwater environment. The Board acknowledges that, as a condition of an EPEA approval, Arclin has committed to a groundwater monitoring program for the stockpiled materials. However, the Board notes that Arclin has not clearly defined its intentions regarding the monitoring of surface water related to the stockpiled waste, nor the regular maintenance measures that will be employed for this stored material. **The Board recommends that Arclin prepare and implement a plan of action, acceptable to and approved by AENV, to ensure that specific and effective interim management measures are in place until final disposal or treatment of this material has been completed. The plan of action should include a scheduled surface water monitoring program to detect any uncontrolled release of leachate generated from the stockpiled waste canola meal.**

4.2.2: Traffic and Rail Use

Views of the Applicant

Baseline Traffic Assessment

Arclin reported that, for Phase II of the Project, a Traffic Impact Assessment (TIA) was conducted as part of a Roadside Development Permit, granted August 29, 2006, from Alberta Infrastructure and Transportation (AI&T) and the Town of Sexsmith. Arclin noted that AMEC Infrastructure Ltd. completed the TIA on the development of Phases I to III of the plant.

Arclin noted that 95th Avenue was a local paved roadway that provided a south access from Highway 2 to the Town of Sexsmith. Arclin stated that Highway 2 was to be up-graded to a twinned, Class A level-of-service highway by October 2007. In addition, Arclin said the design of the intersection at Highway 2 and 95th Avenue would be up-graded to handle the projected traffic volumes and vehicle types to be encountered for the next 20 year period.

Based on the 2004 AI&T survey of vehicles using Highway 2 and 95th Avenue, Arclin reported the average annual daily traffic (AADT) and the average summer daily traffic (ASDT) counts on:

- 95th Avenue
- Highway 2, north of 95th Avenue
- Highway 2, south of 95th Avenue

According to this survey, Arclin reported that 92.2 percent of the vehicles travelling on 95th Avenue were classified as passenger vehicles. On a similar basis, Arclin stated that 89.2 percent of the vehicles on Highway 2 at 95th Avenue were classified as passenger vehicles and 7.9 percent of the vehicles were either tractor-trailer or single-unit trucks.

Arclin stated that two existing road accesses link Arclin's project development area (PDA) to 95th Avenue. Arclin explained that use of the east access road was to be for plant operators, office staff and couriers while the west access road was to be for larger service vehicles and the tractor-trailers that carry the manufactured resin. Arclin noted that the angle of intersection of the plant accesses with 95th Avenue was approximately 90 degrees.

With the completion of Phase II, Arclin indicated that a paved service road would be constructed on the west side of the southbound lane of Highway 2. Arclin noted that this service road, to be located 70 metres west of Highway 2, would intersect with 95th Avenue and extend south to the southern boundary of its industrial site. Arclin identified 97th Street as another public road that intersected 95th Avenue from the north, between the two plant access roads and approximately 360 metres west of Highway 2.

Traffic Assessment Following Completion of Phase III

Arclin explained that plant operations would continue 24 hours a day with two shifts of up to five operators working on shifts from 7 AM to 7 PM. Arclin said that an office staff of 15 people would be present on week days from 8 AM to 5 PM. Arclin estimated that the total number of vehicles (i.e. maximum-minimum, respectively) on any given weekday, associated with this staff and operations, would be:

- West access 27-17
- East access 28-21

Arclin noted that the designed maximum hourly traffic volumes were projected to be 18 vehicles for the east access and five for the west access. Arclin said that the expected designed minimum hourly traffic volumes for the east and west access roads were 13 and four vehicles, respectively. Arclin stated that the future traffic growth rate is zero, as the estimates for traffic presented in the TIA report were that associated with full development of the plant.

Arclin estimated that 25 tractor-trailers would travel to and from the plant per day. Of this tractor-trailer traffic, Arclin anticipated that 60 percent would be double trailers. Arclin reported that the trucks would access 95th Avenue from Highway 2. Arclin approximated that 70 percent of the trucks would arrive from the south on Highway 2 and 70 percent of the trucks would depart from 95th Avenue to the south via Highway 2.

Arclin stated that a typical growth rate of 2.5 percent had been selected and applied to the AI&T traffic data for Highway 2 at Sexsmith and for 95th Avenue to estimate projected traffic volumes, i.e.:

Highway 2

Year 2016:	AADT = 10,985	ASDT = 11,585
Year 2026:	AADT = 13,100	ASDT = 13,810

95th Avenue

Year 2016:	AADT = 2,820	ASDT = 2,975
Year 2026:	AADT = 3,365	ASDT = 3,550

Arclin noted that the Town of Sexsmith was proposing to develop the area west of the railway tracks and south of 95th Avenue as a residential subdivision. Arclin indicated that, while timing was uncertain, full development of the subdivision was to involve 600 lots. Arclin stated that an analysis of increased traffic volume on 95th Avenue, due to the proposed residential development, had been completed.

Overall, Arclin concluded from the traffic assessment that the impact of increased vehicle traffic on the local area highways and roadways was negligible. Arclin believed that area roads would experience a slight increase in outbound traffic, i.e. one to two additional truckloads of formaldehyde per day that had been sold, along with the resin trucks traffic. Arclin reported that increase in traffic experienced during the Phase III construction stage of the plant would be mitigated by managing the timing of the delivery of equipment and material, e.g. using off-peak hours, by providing required temporary traffic controls and by working with the Town of Sexsmith, as necessary.

Arclin noted that the shipments of methanol to the Sexsmith plant would be by rail. Arclin indicated that increases in incoming rail shipments of key raw materials such as methanol would result in a decrease in inbound shipments of formaldehyde. Arclin estimated that the inbound rail traffic associated with the plant would decrease from thirty rail cars per month at start up, to less than eight, once operations had become established. Arclin anticipated that up to twelve rail cars of formaldehyde per month could be shipped from the Sexsmith plant to an Arclin facility in Kamloops, BC and to other users.

Arclin acknowledged that the transportation changes and upgrades recommended by AMEC in its traffic impact assessment report at full plant operation had not been completed as initially described. Arclin summarized the current status of recommended improvements related to transportation as follows:

- The existing simple Type 1 designed curve between the west plant access road and 95th Avenue has not been replaced with a recommended two-centered curve (16-80), in the southeast quadrant of the intersection. Arclin has donated the land, which exists between its property line and 95th Avenue, to the Town of Sexsmith to allow for the completion of this road upgrade.
- The vertical alignment of the west access road with 95th Avenue has not been re-constructed according to Figure D-3.3b ('Highway Geometric Design Manual', Alberta Infrastructure & Transportation) or equivalent municipal standards. To date, the Town of Sexsmith has re-paved and installed a lane on the southeast side of 95th Avenue to allow traffic to turn onto Highway 2.
- The road east of the plant has been paved, while asphalt paving for the west access road to the plant remains incomplete.

Arclin explained that completion of AMEC's recommendations regarding transportation changes and up-grades are the financial responsibility of the Town of Sexsmith. Consequently, Arclin stated that its ability to dictate the project timelines was limited. Arclin stated that it is committed to the implementation of proper roadway design practices, as well as, to the reduction of rail and road traffic, associated with transportation of their chemicals and products, in order to decrease any possible risk to public safety.

Views of the Board

The Board acknowledges that Arclin's completed road and rail traffic impact assessment for the proposed plant development was based on full plant operations at Sexsmith. The Board notes that the results of the traffic impact study were projected to the year 2016 and the assessment indicated that the cumulative impact of Arclin's full plant operations to traffic on the local area highways, roadways and railway would be negligible. The Board accepts the results of the traffic impact assessment and agrees that the cumulative impact of Arclin's full plant operations to LSA traffic would be negligible.

4.3: Groundwater

4.3.1: Groundwater Use

Views of the Applicant

Arclin stated its source of water will be from Aquaterra Utilities Inc., which obtains its water from the Wapiti River south of the City of Grande Prairie. It said that the Aquaterra water capacity is more than sufficient to sustain all current and future water requirements.

Views of the Board

The Board accepts that the source of water for the formaldehyde plant will be from Aquaterra Utilities Inc. and that groundwater will not be used in the process. As such, the Board also accepts that the amount of groundwater available to local groundwater users will not be impacted by Arclin's water use.

4.3.2: Groundwater Protection

Views of the Applicant

Arclin's position with respect to groundwater protection was that the deep groundwater regime will not be impacted by either the former remedial actions at the site, or the proposed formaldehyde plant. Arclin described the deep groundwater as occurring within the nonmarine Cretaceous Wapiti Formation and stated that published information indicates expected groundwater yields from the Wapiti Formation to range between 0.1 and 2.0 L/s (1 to 25 Imperial gallons per minute).

Arclin stated that two factors will limit the mobility of any potential contaminants in the subsurface and thereby protect the deep groundwater. First, the surficial geology at the site consists of glacial till and glaciolacustrine sediments, both of which have inherently low permeability. And second, Arclin proposed to install extensive containment measures and collection systems to deal with any potential chemical spills at the site before they can enter the groundwater environment.

Arclin provided lithologs of 30 boreholes drilled on the site (to depths ranging from 3.1 to 7.6 metres) to assist in remediation and clean-up of the former canola plant site. The lithologs confirmed Arclin's view that the surficial geologic materials consist of glacial till and

glaciolacustrine sediments. Of the 30 boreholes drilled, only seven showed some occurrence of sand in the shallow subsurface. Arclin also provided the litholog of one water well which had been drilled on the property. That log indicated that the thickness of the glacial till is 26.9 metres at the location of the well.

Arclin stated that the formaldehyde plant will be sited on a concrete pad with a stormwater and chemical spill containment and collection system. It said any spills or leaks that may occur from process equipment will be contained by a containment wall and will be recovered, recycled, or disposed of as necessary. Arclin also indicated that any potentially contaminated effluents from storage tank areas will be collected in the plant effluent drain, which will be connected to an effluent storage tank. It stated that sludge from the effluent storage tank would be shipped to a destruction facility or landfill site, and water would be recycled, treated, or otherwise legally disposed of as necessary.

Arclin presented a groundwater monitoring plan prepared by Nichols Environmental (Canada) Ltd. (Appendix G of Appendix X of the EIA).The plan proposed that groundwater monitoring be implemented in two phases as shown in Figure 1.

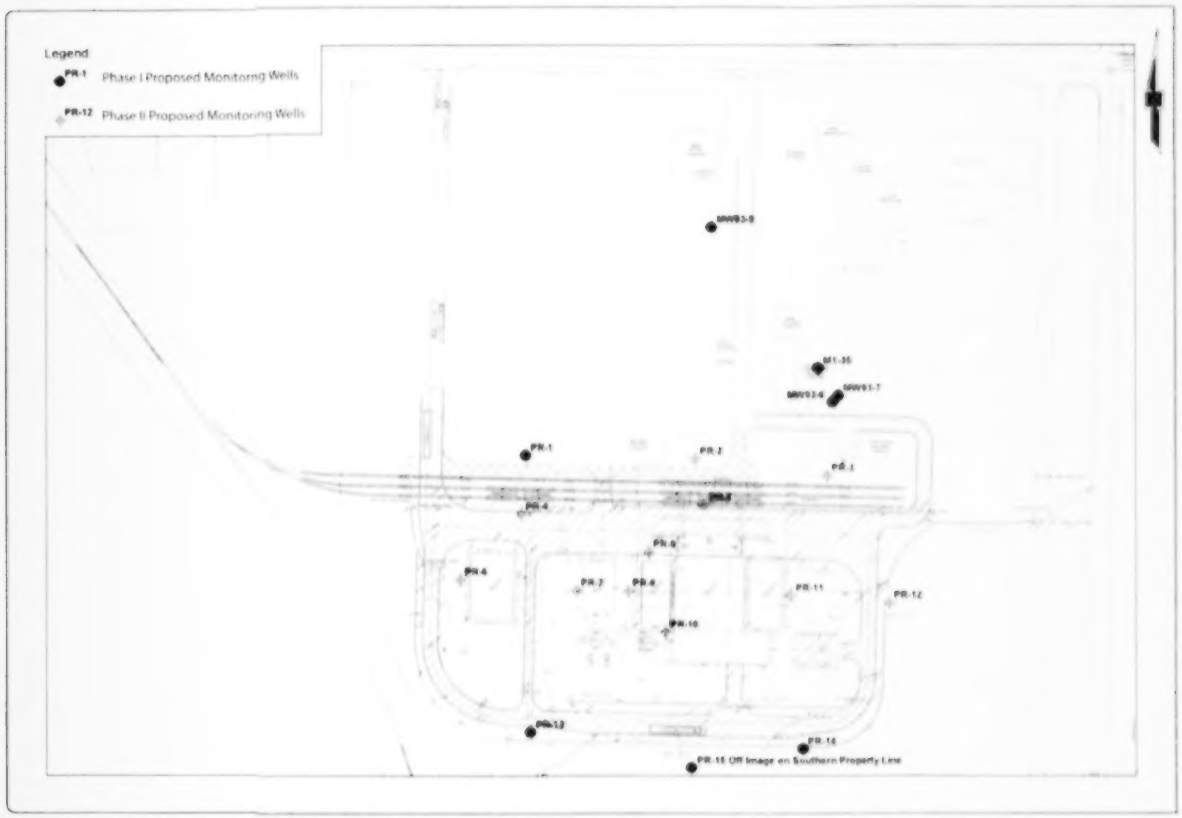

Figure 1: Arclin proposed Groundwater Monitoring Plan. Modified from Nichols Environmental Ltd., March 23, 2007, Proposed Groundwater Monitoring Program, Dynea Formaldehyde Resin Plant, Sexsmith, Alberta. Prepared for Dynea USA Inc., Moncure, NC.

Arclin proposed that Phase I of the monitoring plan was designed to establish baseline groundwater conditions prior to active operation of the resin and formaldehyde plants. To achieve this, Arclin proposed to use two existing monitoring wells (MW93-9 and one of a cluster of wells labelled M1-35, MW93-6 and MW93-7) located north of the Arclin plant complex, and to construct four new monitors. Three of the new monitors (PR-1, PR-13 and PR-14) were proposed to be located around the periphery of the plant complex and one (PR-15) was proposed to be located on the southern property line.

For Phase II of its monitoring plan Arclin proposed to construct eleven additional monitoring wells, also as shown on Figure 1. The locations of these were chosen to identify potential groundwater issues relating to various operational aspects of the entire plant complex (including the formaldehyde plant) as follows:

- Loading and unloading of materials and products along the rail lines
- Issues involving the methanol storage area
- The formaldehyde plant and raw product storage area
- The raw products storage area and process building
- Operations and storage of the finished product
- Potential concerns from previous land use

Arclin proposed that all new monitoring wells would be 7.0 metres deep and that the monitoring would include analysis for the following compounds:

- Formaldehyde
- Ammonia (urea as TKN and NH_3)
- Phenols
- Methanol and hexane
- Routine parameters
- Dissolved metals

Arclin provided evidence that one deep water well, owned by the Town of Sexsmith, was located on the property, but had never been placed in use. In a report[1], Nichols Environmental cautioned that the well should be decommissioned as it represents a potential conduit for contaminants to migrate from the surface to the local potable groundwater supply.

In Section 4.3(b) of the EIA, Arclin stated the water well was located to the east of the current ponds. In response to SIR question 12, which asked Arclin to provide the exact location of the water well, Arclin stated it had discussions with Town of Sexsmith officials, who indicated that the well was probably located on the south property boundary, it was

[1] Nichols Environmental (Canada) Ltd. Phase II Environmental Site Assessment, Former Northern Lite Canola Processing Plant, Sexsmith, Alberta, Prepared for the Town of Sexsmith, September 2001.

never developed for water production and was decommissioned in 1987 or 1988. Arclin's consultant, Nichols Environmental, also contacted the original driller of the water well (Mr. Brian McAllister of McAllister Holdings Ltd.) and reported that Mr. McAllister also could not remember the exact location of the well on the property.

Views of the Board

With respect to uncertainties about the existence of a water well drilled on the property and the danger it might pose to directly contaminate deep aquifers, the Board finds as follows:

- First, while two different potential locations of the water well were provided, neither location is in close proximity to the formaldehyde plant and the plant would therefore not likely impact the well at either location.
- Second, the Board notes that Arclin provided a report that describes the results of electromagnetic surveys conducted over all accessible parts of the site.[2]

The purpose of the surveys was specifically to detect buried metal to depths of three to six metres to assist in clean-up and remediation of the former canola plant operations. Surveyed areas included the area east of the ponds (northeast of the formaldehyde plant) and the southern boundary of the property. The Board notes that while numerous buried metal anomalies were identified, the survey did not report locating a water well on the property. The Board believes it is highly unlikely that such surveys would not have detected the presence and location of a water well constructed of steel casing. The Board therefore concurs with Arclin's and Town officials' belief that the well has most likely been decommissioned and therefore poses no threat to deep groundwater aquifers in the area.

The Board accepts Arclin's position that the deep groundwater within the Wapiti Formation will not be impacted by either the former remedial actions at the site, or the proposed formaldehyde plant. Specifically, the Board accepts Arclin's evidence of the presence of surficial sediments that are both thick (up to 26.9 m), and have inherently low permeability. The Board is confident that these surficial sediments offer excellent natural protection to the deeper bedrock aquifers beneath the site.

The Board is also satisfied that Arclin has included sufficient engineered containment measures and collection systems in the design of the formaldehyde plant to intercept any potential chemical spills before they can enter the groundwater environment.

Nevertheless, the Board is of the view that the groundwater monitoring program that Arclin has proposed as Phase II of its monitoring plan, which is designed to identify potential groundwater issues related to various operational aspects of the entire plant complex (including the formaldehyde plant) should be implemented.

However, the Board notes that Phase II of Arclin's proposed monitoring plan provides for only two monitoring wells in close proximity to the formaldehyde plant, one located west and the other east of the plant. The Board also notes that there is some uncertainty about the

[2] Komex International Ltd., December, 2001: Geophysical Investigations at the Northern Lite Canola Plant. Report prepared for Nichols Environmental Ltd., Edmonton, Alberta.

direction of shallow groundwater flow in the area and is concerned that the proposed monitoring wells near the formaldehyde plant may not be located appropriately to detect impacts to shallow groundwater, if such impacts were to occur. **Consequently the Board requires as a condition that Arclin work with Alberta Environment to ensure that placement of any monitoring wells near the formaldehyde plant will be such that at least one monitoring well will be located down gradient of the plant and will be able to adequately detect any impacts on shallow groundwater that may originate from the plant.**

The Board concurs with Arclin's choice of monitoring parameters and is confident that they are adequate to detect if and when shallow groundwater quality has been impacted.

4.4: Surface Water

4.4.1: Quality and Quantity

Views of the Applicant

To provide a baseline assessment of surface water resources for this application, Arclin conducted a "desktop" review of available information regarding on-site and neighboring surface water resources. Arclin reported that, within the local study area (LSA), wetlands and low areas exist to the west, south and southeast of the project development area (PDA). Arclin noted that no existing natural waterbodies or wetlands exist within the PDA. Arclin observed that agricultural lands, adjacent to the LSA to the west, sloped toward the LSA and the general direction of surficial flow was toward the wetlands to the southeast of the LSA. Arclin also noted that a small unnamed creek traveled through the Town of Sexsmith, across Township Road 734 and Highway 2 and into the quarter section of land located east of the LSA. Arclin expected the interaction between groundwater and surface water to be low due to the probable downward gradients of groundwater in the area.

Arclin reported that the land surface within the PDA had been extensively re-contoured to meet planned geotechnical specifications. Arclin explained that, as part of this redevelopment of the PDA, an application had been made to Alberta Environment, under the *Alberta Water Act*, for approval to re-align the existing drainage channel that runs through the PDA and to change surface water flow patterns resulting from the installation of a drainage ditch system for the plant site. Arclin stated that PDA surface water would be controlled by a series of existing and new concrete and earthen-lined culverts and ditches. Arclin said that surface water runoff from the PDA would be re-directed to a perimeter ditch that would be constructed along the southeast property boundary. Arclin indicated that this main ditch would transfer the runoff water to an existing drainage course adjacent to Highway 2. Subsequently, surface water would be discharged to the area watershed via an existing culvert that passes under Highway 2. Arclin reported that its approval from Alberta Environment for the proposed surface water diversion plan was granted in 2006.

Arclin believed that the post-development surface water flow volumes within the LSA should not be different from the pre-existing rates. Consequently, Arclin concluded that the changes in surface water flow would not disturb the local or regional hydrology.

Arclin described the mitigative measures that were to be implemented to ensure that no deterioration of surface water quality occurred due to runoff from PDA. Arclin said that silt fencing, straw bale barriers and storm drain inlet sediment barriers were to be incorporated into the surface water management plan to prevent excess silt loading that may result from surface soil erosion. Arclin indicated that the formaldehyde plant operating areas are to be protected with spill containment measures. Arclin noted that the surface water collected in this manner is to be stored in the plant recycle water system for reuse in the manufacturing of resin.

Arclin indicated that an existing freshwater storage pond would be maintained for fire-fighting purposes. Arclin said that the water supply for this freshwater pond is to be from precipitation and surface runoff.

In summary, Arclin concluded that the cumulative effect on the area hydrology as a result of the construction, operation and reclamation phases of the completed plant would be minimal.

Views of the Board

Arclin concluded that the potential impact by all of its plant operations on area hydrology would be minimal. In terms of the potential cumulative impact of this application on surface water quantity, the Board agrees with Arclin's conclusion that the effect will be minimal. However, in terms of potential cumulative impact of this application on surface water quality, the Board believes that insufficient site specific data have been provided to establish such a conclusion, now or in the future. While acknowledging that the Arclin plant is designed to be a zero discharge operation (i.e. release of only boiler and cooling tower blowdown wastewater to Sexsmith municipal treatment system), the Board notes that this property is a "brownfield" site. **Therefore, as a condition of approval for this application, the Board directs Arclin to plan and implement a baseline assessment of surface water quality in the LSA that is acceptable to and approved by AENV prior to the start-up of Phase III operations.** A baseline assessment will establish an initial reference database for surface water quality in the LSA.

4.4.2: Monitoring

Views of the Applicant

Nichols Environmental (Canada) Ltd. (Edmonton, AB). and Gartner Lee Ltd. (Grande Prairie, AB) concluded, in their "desktop" assessment of water resources for Arclin that the current waste canola meal stockpiled on the south portion of the PDA may potentially affect the quality of surface and groundwater as a result of the leachate that would be produced. These consultants recommended that monitoring should be implemented for possible impacts of leachate to both groundwater and surface water. Arclin reported, however, that they did not agree with their consultants' assessment regarding the need for surface water quality monitoring. Arclin indicated that AENV concurred with its view on this issue. Consequently, Arclin stated that the objectives of the proposed new groundwater monitoring

program would be limited and would attempt to detect and assess potential impact from the operating plant area only.

Arclin noted, however, that AENV will require a semi-annual sampling and analyses of groundwater from six, on-site groundwater monitoring wells required as a result of historical practices conducted on the property. Arclin indicated that surface water from the vicinity of the stockpile area would also be collected periodically as part of this monitoring protocol.

Views of the Board

The Board believes that Arclin should consider all known and significant sources that may possibly impact surface water when assessing the potential cumulative impact of its operations on the quality of surface water resources in the LSA. The Board notes that Arclin has a regulatory responsibility to manage the long-term storage of stockpiled waste canola meal, as well as the operation of a land farm for waste canola meal. The Board finds that Arclin has not presented a clear surface water quality monitoring strategy that addresses both the onsite waste management activities it has assumed, as well as, the operations of the planned formaldehyde resin manufacturing plant. **The Board recommends that Arclin develop and implement an integrated and scheduled surface water quality monitoring plan for the industrial site that is acceptable and approved by AENV. The surface water quality monitoring plan should encompass both Arclin's plant operations and the continuing waste canola meal remediation activities.**

4.4.3: Water Use

Views of the Applicant

Arclin reported that all the domestic and process water required by Phases I to III of the plant operations would be supplied by Aquaterra, a regional utilities company. Arclin stated that a water supply of 100 Imperial gallons per minute (gpm) has been promised by Aquaterra. Arclin estimated that the total volume of process water to be used will be 89 US gpm (74 Imperial gpm). Of this total quantity of water, Arclin said that the formaldehyde plant was expected to use 32 US gpm (26.6 Imperial gpm) and the resin plant was expected to use 57 US gpm (47.4 Imperial gpm). In the event of low flow, Arclin noted that a contingency plan, for the potable and process water supply required to serve both the resin and formaldehyde plants, would be in place. Arclin indicated that a component of the contingency plan involved installation of a service water storage tank with a capacity of 12,000 US gallons (9,983 Imperial gallons). In addition, Arclin noted that there would also be two demineralized water storage tanks with a capacity of 12,500 US gallons (10,399 Imperial gallons), filled to capacity at all times.

Wastewater generation and release

Arclin stated that all process and wastewater generated by the formaldehyde plant would be recovered, contained and evaluated for reprocessing by the resin plant. Arclin submitted that the plant site, in the cumulative scenario, would have zero discharge of any contaminated waters. Arclin stated that the only water discharged by the operating plant would be that discharged from the cooling towers and boilers as a result of blowdown

procedures. Arclin acknowledged that this blowdown wastewater would be released to the Town of Sexsmith wastewater treatment system. Arclin estimated that the total volume of industrial wastewater released to the Town of Sexsmith wastewater treatment facility will be 55 m^3 per day. Arclin reported the following sources of blowdown wastewater and estimated the following maximum discharges:

- boiler blowdown of 3.6 m^3/day
- design resin tower bleed of 27.8 m^3/day
- design formaldehyde tower bleed of 24 m^3/day

Aquaterra reported that the Town of Sexsmith employed an anaerobic and aerobic system of lagoons, with a total capacity of 479,000 m^3, to stabilize and treat the domestic wastewater. Aquaterra stated that treated effluent from the aerobic lagoons ultimately discharges through a natural drainage ditch to an unnamed creek and subsequently to the Smoky River. Aquaterra reported that no sludge has been removed from the treatment lagoons to date.

Arclin listed 13 chemical formulations used in its procedures for passivation (i.e. corrosion inhibition), water treatment and the inhibition of bacterial fouling in the cooling towers and boilers. Based on normal treatment programs, Arclin estimated the maximum discharge of active chemicals released from the various plant sources to the Town of Sexsmith wastewater treatment system. Arclin concluded that the discharged blowdown wastewater would meet allowable concentrations of metals and total dissolved solids of 1000 mg/L, as specified in Schedule B, Sections 25.10 and 25.15 of the Town of Sexsmith Bylaw 820. In addition, Arclin stated that the blowdown wastewater released would not interfere with any part of the normal function of the wastewater treatment process specified in Schedule B, Section 25.02 of the Town of Sexsmith Bylaw 820 and no municipal treatment facility limitations existed for this industrial wastewater.

Views of the Board

The Board finds that there is a lack of information on the general aquatic transformation, fate and toxicity of the treatment chemicals involved in Arclin's blowdown wastewater. The Board believes that, in view of the nature of these treatment chemicals, greater consideration should be given to the potential short and long-term impacts of the industrial wastewater constituents on the designed performance of the Town of Sexsmith's wastewater treatment system. **The Board therefore recommends that Arclin work with Aquaterra and AENV to assess this issue and subsequently, develop and implement an effective monitoring program for Arclin's discharged industrial wastewater that will ensure ongoing and full agreement with the requirements of Town of Sexsmith Bylaw 820, Schedule B, Section 25.**

4.5: Ecosystem Issues

Views of the Applicant

According to Arclin the project site is located in the Aspen Parkland Ecosystem which is characterized by broad, gently rolling plains, with the occasional upland and deeply incised river valleys. Based on a review of a 2003 air photograph (Figure 2), Arclin indicated that the predominant habitat characteristics in the vicinity of the project site are:

- Urban development north of the site. The predominant urban development is the Town of Sexsmith which consists mostly of residential developments. Residential properties are also located northwest of the site and a farm property is located south of the site. Commercial property is located immediately north of the site.
- Agricultural land to the south, east and northeast of the site. Common crops are wheat, canola, barley and oats.
- Wetlands located to the west, south and southeast of the project site. Vegetation in the wetlands is likely dominated by sedge and rush species and by aquatic plants.
- Riparian vegetation (dominated by willow/sedge communities) outlining the fringes of several wetlands that are located to the west, south and southeast of the site. A meadow habitat to the west of the site is likely a dried up wetland area.
- Aspen parkland woodlots to the west of the project site and in the southwestern corner of the site.

Figure 2: Habitat Classification in the Vicinity of the Arclin Project (from Nichols Environmental, et al., 2007)

Arclin indicated that the landscape and habitat surrounding the site have been significantly altered due to urban, agricultural and industrial development dating back over 50 years. Scattered wetlands, meadows and stands of trees are all that remain of the naturally occurring habitat and likely represent the most suitable habitat for local wildlife. Clairmont Lake, a significant waterfowl staging and breeding habitat located 7.5 km south of the site, is the nearest area of provincial significance. Due to the distance of Clairmont Lake from the facility, it was Arclin's view that the project will not have any adverse impacts on the lake.

Arclin indicated that the project site has been extensively altered by reclamation activities associated with the former canola plant and construction of Phases I and II. The predominant vegetation on the project site is early successional which is tolerant to disturbance. Arclin expected that site disturbance will continue due to reclamation activities and construction activities at the plant; however, it indicated that no adjacent lands will be disturbed as a result of project construction.

According to Arclin, the main process chemicals associated with the Phase III development include formaldehyde, urea, phenol, methanol, melamine, sodium hydroxide (at 50 percent solution), and potassium hydroxide (at 50 percent solution). Arclin's view was that formaldehyde and phenol represent the highest risk to wildlife and vegetation due to the toxic effects through air and water. Arclin indicated that in the April to October period the potential air dispersion zone is expected to the NNE, toward Highway 2 and adjacent agricultural land. However, in the winter months, the prevailing wind direction is toward the SSE, in the direction of the large wetland area. Arclin suggested that the potential for adverse impact to the wetlands was low due to the lower activity level in the wetlands during winter. Also, there is a low likelihood that formaldehyde and phenol would persist in snow due to the instability of these chemicals and thus would not have an impact on the wetlands in the spring.

The applicant based the ecosystem assessment on a "desktop" review of available information. The review concluded that any terrestrial effects of the project are expected to be of low consequence for the following reasons:

- Under normal operating conditions, the formaldehyde plant will not create waste or effluent streams that require specialized treatment or disposal. There are no by-products or designated waste streams produced in the manufacture of formaldehyde. The formaldehyde plant is designed to be "zero discharge" so there will be no process liquid waste streams. However, effluents may come from a few sources, namely sanitary effluents, blow downs, the plant pad area and the collection of storm/rain water.
- Air emissions (formaldehyde, methanol or other volatile organic compounds) from the formaldehyde process building and storage tank vents will be collected and destroyed using a thermal oxidizer to the highest possible destruction rate currently technically available. Emissions from vents on the formalin storage tanks will also be collected and emissions treated as is the case with the existing resin plant in the regenerative thermal oxidizer.
- The processing equipment for the formaldehyde plant will be sited on a concrete foundation with appropriate spill containment providing segregation from site storm water and runoff. Since the formaldehyde plant is contained within the overall resin plant process area, runoff control and containment were considered during the Baseline – Phase II resin plant development phase.

As part of the desktop terrestrial study, the Sustainable Resources Development biologist for the area was consulted by Arclin. The biologist indicated that the area is not regionally significant for ungulates because of the extensive agricultural and urban development. However, the biologist indicated that the scattered stands of trees may provide some cover for ungulates and nesting habitat for birds and that the wetlands to the southwest, south and southeast of the site are likely useable habitat for amphibians. It is the opinion of the biologist that any species at risk are most likely to be bird or amphibian species. Amphibians are sensitive to water quality changes and birds are very responsive to change (as a mobile species). The biologist requested that baseline wildlife surveys for amphibians and birds be completed prior to startup of the operation for the following reasons:

- To determine if there are any species at risk present on the lands in questions (in which case a mitigation plan would be requested)

- To gather baseline data on wildlife communities prior to the development

The applicant contacted the Horse Lake First Nation, Duncan's First Nation and the Flying Shot Lake Settlement regarding potential project impacts on traditional land use. No issues of concern were identified.

Views of the Board

The Board notes that the terrestrial ecosystem assessment conducted for the project was predominantly a desktop exercise and is of the view that the field surveys for birds and amphibians recommended by the area Sustainable Resource Development biologist should be conducted to corroborate the findings of the desktop review. In conducting the surveys, key indicator species should be identified and the *General Status of Alberta Wide Species* (1995) and the *Committee on the Status of Endangered Wildlife in Canada* (2005) should be consulted to determine their status. **As a condition of this approval, as Arclin has committed, it is required to conduct field surveys for amphibians and birds prior to issuance of an *Environmental Protection and Enhancement Act* (*EPEA*) approval from Alberta Environment. Further, Arclin is required to address any mitigative actions required as a result of the surveys to the satisfaction of AENV.**

The Board agrees that potential impacts on wildlife and vegetation from air emissions will be minimal, since air emissions from the formaldehyde process building and storage tank vents will be collected and destroyed using a thermal oxidizer to the highest possible destruction rate currently technically available. Ambient and stack monitoring requirements in the EPEA approval will be extremely important for establishing potential impacts of any air emissions on terrestrial ecosystems.

SECTION 5: HEALTH AND SAFETY

5.1: Emergency Response Plan

Views of the Applicant

Arclin did not prepare and submit a site-specific Emergency Response Plan (ERP) as part of its EIA. Rather, it appended to the EIA the *Winnfield Emergency Plan* developed for the Arclin Plant in Winnfield, Louisiana. The Winnfield plant manufactures thermosetting resins for use by the wood products industry and also manufactures formaldehyde on site in two separate plants.

In response to SIR question 67(b), Arclin explained that following discussions with AENV, it did not create a site-specific ERP because operations had not yet commenced. However, Arclin reported that all Arclin plants follow the same ERP format and are required to conduct annual drills involving local emergency resources. Arclin has communicated with police, fire and rescue services in Sexsmith and Grande Prairie about the nature of the facility and will continue to meet with ambulatory care and local hospitals. Arclin also indicated that it understands the regulatory requirements applicable under Transport Canada's Emergency Response Assistance Program and Environment Canada's Environmental Emergency (E2) regulations. Included with the SIR response was Arclin's *Emergency Response Standard Practice* document.

While not site-specific, Arclin included a number of general comments about emergency response planning in its EIA. According to Arclin, an ERP provides *"a series of quick reaction checklists to guide the response of employees of [Arclin]/Sexsmith Plant to emergency situations and events"*. As well as meeting U.S. requirements, Arclin's ERP will meet the requirements in Environment Canada's *Environmental Emergency Regulations* under CEPA.

While an ERP in Arclin's view, cannot anticipate and provide for every conceivable emergency, employees involved in an emergency can use the ERP as a guide combined with their common sense, experience and training. The Sexsmith ERP is to apply to all employees, contractors and visitors at the plant and to all raw material and operating chemical shipments destined for the Sexsmith plant and all products being shipped from the Sexsmith plant.

The Arclin EIA listed the topics that will be included in the ERP. The Applicant committed to document the facility emergency response plan and to distribute it throughout the plant. As well, Arclin would:

- Develop procedures for using, inspecting, testing and maintaining emergency response equipment
- Establish a training program to instruct all employees
- Develop procedures to review and update the ERC and to inform employees of the updates

Arclin is also committed to contact residents in case of an emergency on site.

In reply to a request from the Board for further information regarding the anticipated date the ERP will be in place and the stakeholders Arclin will consult in completing the ERP, Arclin provided the following response in a letter dated July 16, 2008:

> *"Arclin has drafted an Emergency Response Plan but has not finalized said plan as a result of recommendations made, yet not incorporated, during the Transport Canada phenol emergency response table top exercise conducted September 26, 2007. Those in attendance during the drill and consulted with before and/or during the drafting of the Emergency Response Plan include: Grande Prairie Fire Department, Sexsmith Fire Department, County of Grande Prairie, Town of Sexsmith, Shell Oil, CEDA and Newalta (emergency response contractors) and Transport Canada. Arclin will continue to consult with these entities and others as appropriate during the completion of the Emergency Response Plan."*

Views of the Board

The Board observes that there are some sections in the *Winnfield Emergency Plan* which could be applicable to the proposed Sexsmith facility, including for example, the sections on emergency shut-down operations, media relations, and decontamination of personnel. However, there are many sections in the *Winnfield Emergency Plan* which must be tailored to meet the needs of the Sexsmith facility because they require contact information specific to the Sexsmith facility or will need to reference Canadian regulatory requirements.

As a condition of its approval, the Board requires that Arclin develop an ERP satisfactory to the Town of Sexsmith, prior to the start up of Phase III. In order to incorporate post-construction considerations, the Board further requires that Arclin update the ERP to the satisfaction of the Town of Sexsmith within six months of Phase III start up. In developing the plan, the Board recommends that Arclin and the Town of Sexsmith request the assistance and support of the Alberta Emergency Response Management Agency.

5.2: Health Concerns

Views of the Applicant

Arclin conducted a Human Health Risk Assessment which states that its methodology was consistent with protocols developed by Health Canada, Canadian Council of Ministers of the Environment, United States National Research Council and United States Environmental Protection Agency.

Arclin employed the following four-step approach in conducting the human health risk assessment:

- Problem Formulation
  - The study area was the same as identified for the air quality study area (the site fenceline). The local study area and the regional study area were assumed to be the same due to the absence of other significant industrial operations in the vicinity.
  - Arclin identified the contaminants of potential concern for Phase III of the project as being carbon dioxide, carbon monoxide, formaldehyde, methanol, methyl formate and nitrogen oxides. Urea, phenol, sulphur oxides and $PM_{2.5}$ were the contaminants of potential concern for the cumulative case.
  - Arclin identified that the following pathways were considered for evaluation: air, water, soil, plant and animal tissue and fish tissue. The only pathways that were determined to require evaluation were air and soil.
  - Arclin identified the following receptor locations:
    - Town of Sexsmith
    - Existing residences adjacent to the project property to the northwest
    - Potential future residences to the west, south and east of the project property on currently undeveloped parcels

    Arclin assumed that the residential receptors would be located at a point where the air quality models projected the maximum fence line concentration for each chemical of concern.

- Toxicity Assessment

  The authorities consulted by Arclin to determine the exposure limits for adverse human health effects were:

  - Alberta Environment
  - Agency for Toxic Substances and Disease Registry
  - American Conference of Governmental Industrial Hygienists
  - American Industrial Hygiene Association
  - California Office of Health Hazard Assessment
  - Health Canada
  - National Institute of Public Health and the Environment
  - Ontario Ministry of the Environment
  - United States Occupational Safety and Health Administration
  - United States Environmental Protection Agency
  - World Health Organization

  The assessment examined potential acute (short-term – period of minutes up to a day) and chronic (long-term) health risks associated with the identified chemicals of concern.

- Exposure Assessment
  - The primary exposure pathway evaluated was air inhalation for the human receptors
  - Chemical fate and persistence screening was conducted for all identified chemicals of concern and none was found to be persistent or have the potential for bioaccumulation, therefore exposure through secondary pathways would not be expected. Having said that, soil accumulation modeling was conducted on phenol and predicted soil concentrations were found to be below Alberta Environment's Tier I soil criteria for residential/park use.
  - The assessment used the predicted ambient air concentrations for the formaldehyde plant and cumulative case from the air dispersion model in the environmental impact assessment.
  - Background concentrations of contaminants of potential concern were obtained from: project specific ambient air monitoring, the Henry Pirker regional air monitoring station, published sources where regional data were not available and in cases where no data were available, background was assumed to be zero.
  - For the chronic inhalation assessment, the following assumptions were made:
    - The operational life of the project was 75 years to be conservative
    - Residential receptors would maintain a constant residency for 75 years. The assessment was conducted considering the most sensitive subpopulations (e.g. the elderly and children).

- Risk Characterization
  - Concentration ratios (CR) were used to characterize the risk from the chemicals of concern with:

    CR = air concentration ($\mu g/m^3$)/acute or chronic exposure limit ($\mu g/m^3$)

    Concentration ratios were interpreted as follows:

    CR≤1 – indicates that the estimated exposure is less than or equal to the exposure limit and negligible health risks are predicted

    CR>1 but ≤10 – indicates low to moderate potential risk, but the significance must be determined in light of the conservatism built into the risk model

    CR>10 – indicates moderate to high potential health risks

Arclin concluded that for both the maximum ground level concentration and the residential receptor, concentration ratios for each averaging time for the formaldehyde plant and cumulative cases for the acute scenario were at or below 1.0 for all the chemicals of concern (Table 2). As a result, no acute health effects are expected.

Arclin concluded that for both the maximum ground level concentration and the residential receptor, concentration ratios for each averaging time for the formaldehyde plant and cumulative cases for the chronic scenario for chemicals of concern, except NO_x, had a CR at or below 1.0 for all the chemicals of concern (Table 3). Arclin concluded that although the chronic nitrogen oxide CR for the residential receptor for the cumulative case is over 1.0, the NO_x CR for the formaldehyde plant is under 1.0 (Table 3). Arclin indicated that since the CR for NO_x from both the formaldehyde plant and cumulative case are relatively similar and both values are below 10, no chronic effects are expected in association with the project's NO_x or any of the other chemicals of concern emissions.

		Phase III		Cumulative		Cumulative - Background	
Parameter	Averaging Time	Maximum Ground Level Concentration	Fence Line	Maximum Ground Level Concentration	Fence Line	Maximum Ground Level Concentration	Fence Line
Carbon Dioxide	1 hr	0.015	0.0074	0.026	0.013	0.026	0.013
Carbon Monoxide	1 hr	0.0032	0.0016	0.12	0.08	0.07	0.03
	8 hr	0.0081	0.0039	0.30	0.20	0.18	0.07
Formaldehyde	1 hr	0.017	0.0092	0.048	0.037	0.023	0.011
	24 hr	0.0099	0.0046	0.039	0.031	0.013	0.0057
Methanol (as VOC)	1 hr	0.00005	0.00003	0.0028	0.0027	0.0001	0.0000
Methyl formate	8 hr	0.00006	0.00003	0.00006	0.00003	0.00006	0.00003
NO_x	1 hr	0.0068	0.0033	0.54	0.27	0.38	0.11
	24 hr	0.014	0.0066	1.0	0.49	0.76	0.21
Phenol	1 hr	0.00	0.00	0.11	0.10	0.006	0.003
	24 hr	0.00	0.00	0.35	0.34	0.021	0.009
PM 2.5	24 hr	0.00	0.00	0.41	0.41	0.01	0.00
SO_x	0.16 hr	0.00	0.00	0.016	0.011	0.0075	0.0021
	1 hr	0.00	0.00	0.018	0.012	0.0083	0.0024
	24 hr	0.00	0.00	0.070	0.044	0.036	0.010
Urea	8 hr	0.00	0.00	0.0003	0.0001	0.0003	0.0001
Cumulative CR (≥ 8 hr)		0.024	0.011	1.551	0.968	0.813	0.230

Notes:

- A CR ≤ 1 indicates that the exposure concentration is less than the exposure limit, and no acute health effects are expected
- Averaging time indicates the time period over which the associated exposure limit is applicable.
- Acute CRs were summed for all chemicals having a potential respiratory effect (irritation or more substantial effect) at an 8-hour or greater averaging time. Chemicals included formaldehyde, methyl formate, nitrogen dioxide, PM2.5 and sulphur dioxide.

Table 2: Acute Concentration Ratios for Worst-Case Maximum Exposure and Residential (Fence Line) Receptors, Adapted from "Human Health Risk Assessment", December 2007, Table 9

	Phase III		Cumulative		Cumulative - Background	
Parameter	Maximum Ground Level Concentration	Fence Line	Maximum Ground Level Concentration	Fence Line	Maximum Ground Level Concentration	Fence Line
Carbon Dioxide	NA	NA	NA	NA	NA	NA
Carbon Monoxide	NA	NA	NA	NA	NA	NA
Formaldehyde	0.26	0.12	1.00	0.81	0.34	0.15
Methanol (as VOC)	0.0004	0.0002	0.003	0.003	0.0004	0.0002
Methyl formate	0.002	0.001	0.002	0.001	0.002	0.001
NO_x	0.0452	0.0218	2.90	1.08	2.52	0.71
Phenol	0.00	0.00	0.355	0.342	0.021	0.009
PM 2.5	0.00	0.00	0.43	0.41	0.02	0.005
SO_x	0.00	0.00	0.196	0.094	0.144	0.041
Urea	NA	NA	NA	NA	NA	NA
Cumulative CR	0.05	0.02	3.52	1.59	2.69	0.75

Notes:

- A CR ≤ 1 indicates that the exposure concentration is less than the exposure limit, and no chronic health effects are expected.
- NA indicates not applicable for chronic exposure period.
- Chronic CRs were summed for all chemicals having a potential respiratory effect. Chemicals included methyl formate, nitrogen dioxide, PM2.5 and sulphur dioxide.

Table 3: Chronic Concentration Ratios for Worst-Case Maximum Exposure and Residential (Fence Line) Receptors, Adapted from "Human Health Risk Assessment", December 2007, Table 10

Views of the Board

The Board agrees with the approach taken by Arclin in conducting the Human Health Risk Assessment. The Board observes that there is a low to moderate potential chronic health risk associated with the NO_x emissions for the cumulative case, but as Arclin indicated in its CR approach, the significance of this value must be determined in light of the conservatism built into the risk model. The Board believes that Arclin built conservative assumptions into the model and used conservative expected emissions for model inputs. Therefore, a value under 10 would not be expected to have any health effects.

The Board agrees that there are no expected acute or chronic health effects at ground level or at the fenceline for the formaldehyde plant or for the cumulative case.

As indicated in Section 4.1.1 of this report, the ambient air modeling is based on data that are not necessarily site specific and the modeling results are only as good as the assumptions made. Accordingly the Board believes that early validation of the ambient conditions is necessary and requires a condition for more frequent ambient monitoring following start-up.

SECTION 6: BOARD DECISION

6.1: Overview

Section 2 of the *Natural Resources Conservation Board Act* establishes the Board's mandate, which is to determine whether the proposed Arclin project is in the public interest, having regard to its social and economic effects and the effect of the project on the environment. In exercising its authority under this provision, the Board has reviewed and considered the environmental impact assessment submitted by Arclin to Alberta Environment as well as all additional information submitted by Arclin in response to supplemental information requests and Board questions.

The Board does not have a fixed formula for determining whether a reviewable project is in the public interest. To a large extent, the result of any Board review will be shaped by the nature of the project under review, its location, community support for the project, the project's impact on the natural environment and human health, and the extent of existing developments in the area.

Nevertheless, under its statutory mandate, the Board must have regard for and balance the economic, social and environmental effects of a proposed project. At minimum any proposed project subject to Board review must provide an economic benefit to the proponent, and to the broader community; in many cases the project will also benefit the region, the province and beyond. As well, the Board must be convinced that a proposed project will not result in serious harm to the social fabric of the community, the natural environment or the health of members of the public affected by the project.

In evaluating the social and environmental impacts of a proposed project the Board understands that it is unlikely that any reviewable project will have no impact on the community or natural environment. The challenge for the Board in any specific case is to determine whether a proposed project will result in negative impacts that are unacceptable. To ascertain and evaluate any potential negative social and environmental impacts of a proposed project, the Board will consider the scope, quality and reliability of information submitted by the proponent predicting these effects, the risk of a negative effect occurring, preventative measures proposed by the applicant, planned mitigation measures, compliance with current regulations and standards, and follow-up surveillance and monitoring. Through a consideration of these factors, the Board will make a determination as to whether the predicted impacts are acceptable. If warranted, the Board will attach conditions to its approval to ensure that necessary steps are taken to protect the community and the environment.

6.2: Rationale

As established earlier in this decision, the Arclin project consists of a formaldehyde production facility which constitutes Phase III of a three-phase project, with Phases I and II already having been approved by Alberta Environment. Phases I and II consist of bulk storage and reloading facilities, and resin production facilities. The entire operation will produce resins for the regional oriented strand board, plywood and medium density fiberboard markets. Without approval of the Phase III formaldehyde operation, Arclin will ship formaldehyde by rail to supply its operation.

The Board has taken a conservative approach to assessing the incremental impacts of the formaldehyde operation and has limited its review to those impacts associated with Phase III, subject to its obligation to consider any significant cumulative impacts resulting from the three phases of the facility considered together.

The Board is satisfied that the formaldehyde plant will add to the long term sustainability of the Sexsmith operation. Eliminating reliance on an out-sourced input such as formaldehyde may provide improved cost control, assurance of supply and reduced input costs. These would ultimately add to the long term viability of the plant, job security for workers and a more predictable tax base for the municipality. The Board also concludes that the proposed plant will provide a net economic benefit to the community and the region through the creation of new jobs, significant capital expenditures, additional spin-off jobs in the transportation and service sectors, and taxes paid to the local municipality. In the interest of promoting continuous improvement, the Board recommends that Arclin keep abreast of new technologies for their potential to replace formaldehyde based processes in the production of resins.

Arclin has advised the Board that there will be a delay in the construction and start-up of the project as a result of the current market for adhesives in the forest products industry. As a consequence the Board has considered whether to include a condition that would require commencement of construction by a specific date. The inclusion of such a provision may be deemed necessary if the uncertainty associated with a delay in construction had the potential to negatively affect land use planning or other development activities. In this case the Board has determined that such a provision is not appropriate as the reviewable project is the third phase of an industrial development that, even with significant delays associated with Phase III, has established an existing land use for the commercial site. The Board is also aware that the Arclin facility will require an approval from Alberta Environment that will have a specified term and will be subject to review periodically during the life of the facility.

Throughout the text of this decision, the Board has arrived at a number of conclusions regarding the impacts of the project on the community and the environment. These conclusions form the basis of the Board's final decision and are set out below:

Air Quality

The Board agrees that the modeled maximum ground level concentration of formaldehyde and all other air emissions are well below the Alberta Ambient Air Quality Objectives. With additional conditions imposed by the Board requiring that Arclin implement a fugitive emissions control program and that Arclin not exceed ground level concentrations found in the Alberta Ambient Air Quality Objectives at any time, with any exceedances reported to Alberta Environment for follow-up, the Board is satisfied with Arclin's proposal regarding air emissions.

Air Monitoring

The Board agrees that Arclin's plans for the proposed stack monitoring of emissions are sufficient for the formaldehyde plant. For ambient air monitoring in relation to Phase III, the Board notes that Arclin plans to amend its air monitoring plan to include VOC (as methanol), although it will not supplement the current number of monitoring stations or alter their proposed locations. To ensure early validation of air dispersion modeling results, the Board

is adding a condition requiring additional ambient air quality monitoring in the first six months of operation of the formaldehyde plant. The Board also recommends that Arclin maintain active membership in the Peace AirShed Zone Association.

Climate Change

The Board agrees that the greenhouse gas contribution from the formaldehyde facility will be minimal.

Noise

The Board agrees that the formaldehyde plant likely will not have any adverse impact on the community in terms of noise, but also understands that noise levels are required to remain below levels accepted under municipal bylaws. The Board recommends that noise levels be mitigated to the maximum levels of 45 decibels at night and 55 decibels during the day at the fenceline.

Site Reclamation

The Board acknowledges that the Arclin site is a "brownfield site" which was formerly occupied by Northern Lite Canola Inc. and that the site has been remediated to meet CCME Commercial/Industrial criteria. In the Board's view, the community will benefit from Arclin's decision to locate on this brownfield site and from future actions by Arclin to further remediate the site. Nevertheless, there remains excavated and stockpiled waste canola meal located along the southern boundary of Arclin's property resulting from the recontouring of the industrial site and relocation of an existing land farm. The Board believes that, without specific monitoring and mitigation measures, the leachate generated from the waste stockpile may negatively impact surface water and the shallow groundwater environment.

In light of the fact that Arclin has not clearly defined its intentions regarding the monitoring of surface water related to the stockpiled waste, nor the regular maintenance measures that will be employed for this stored material, the Board recommends that Arclin prepare and implement a plan of action, acceptable and approved by Alberta Environment, to ensure that specific and effective interim management measures are in place until final disposal or treatment of this material has been completed. The plan of action should include a scheduled surface water monitoring program to detect any uncontrolled release of leachate generated from the stockpiled waste canola meal.

Traffic and Rail Use

The Board accepts the results of the Arclin traffic impact assessment and agrees that the cumulative impact of Arclin's full plant operations on traffic in the Local Study Area would be negligible.

Groundwater Use

The Board accepts that the source of water for the formaldehyde plant will be from Aquaterra Utilities Inc. and that groundwater will not be used in the process. The Board also accepts that the amount of groundwater available to local groundwater users will not be impacted by Arclin's water use.

Groundwater Protection

The Board accepts Arclin's position that the quality of deep groundwater within the Wapiti Formation will not be impacted by either the former remedial actions at the site or the proposed formaldehyde plant. The Board is also satisfied that Arclin has included sufficient engineered containment measures and collection systems in the design of the formaldehyde plant to intercept any potential chemical spills before they could enter the groundwater environment. The Board agrees that the groundwater monitoring plan proposed by Arclin should be implemented but, because of uncertainty about the direction of groundwater flow in the area, the Board is adding a condition that Arclin work with Alberta Environment to ensure that placement of any monitoring wells near the formaldehyde plant will be such that at least one monitoring well will be located down gradient of the plant and will be able to adequately detect any impacts on shallow groundwater that may originate from the plant. The Board concurs with Arclin's choice of monitoring parameters and is confident that they are adequate to detect if and when shallow groundwater quality has been impacted.

Surface Water

The Board agrees with Arclin's conclusion that the potential cumulative impact of this application on surface water quantity is minimal. However, the Board believes that insufficient site specific data have been provided to establish the cumulative impact of the application on surface water quality and as a result, the Board is adding a condition requiring Arclin to plan and complete a baseline assessment of surface water quality, acceptable to and approved by Alberta Environment, prior to the start-up of Phase III operations.

Surface Water Monitoring

The Board finds that Arclin has failed to present a clear surface water monitoring strategy for the waste management activities it has assumed and the operations of the planned formaldehyde resin manufacturing plan and therefore recommends that an integrated and scheduled surface water monitoring plan be developed and implemented for the industrial site, acceptable to and approved by Alberta Environment. The surface water quality monitoring plan should encompass both Arclin's plant operations and the continuing waste canola meal remediation activities.

Wastewater

It is the Board's view that given the nature of chemicals involved in Arclin's blow-down wastewater, as well as a lack of information on the general transformation, fate and toxicity of these compounds, greater consideration should be given to the potential short and long-term impacts of the industrial wastewater constituents on the designed operation of the Town of Sexsmith's lagoon wastewater treatment system. Accordingly, the Board recommends that Arclin work with Aquaterra and Alberta Environment to assess this issue and develop and implement an effective monitoring program for Arclin's discharged industrial wastewater that will ensure ongoing and full agreement with the requirements of Town of Sexsmith Bylaw 820, Schedule B, Section 25.

Ecosystem Issues

The Board agrees that potential impacts on wildlife and vegetation from air emissions will be minimal since air emissions from the formaldehyde process building and storage tank vents will be collected and destroyed using a thermal oxidizer to the highest possible destruction rate currently technically available. As recommended by Alberta Sustainable Resource Development, the Board is adding a condition requiring that field surveys for birds and amphibians be conducted prior to the issuance of an approval from Alberta Environment under the *Environmental Protection and Enhancement Act* (EPEA), with any required mitigation addressed to the satisfaction of AENV.

Emergency Response Planning

The Board notes that while some portions of the sample Emergency Response Plan (ERP) included with the Arclin environmental impact assessment could be used for the Sexsmith facility, other sections would need to be tailored to meet the specific needs of the proposed Arclin facility. Accordingly, the Board is adding a condition requiring Arclin to develop an ERP satisfactory to the Town of Sexsmith prior to the startup of Phase III. In order to incorporate post-construction considerations, the Board further requires that Arclin update the ERP to the satisfaction of the Town of Sexsmith within six months of Phase III startup. In developing the ERP, the Board recommends that Arclin and the Town of Sexsmith request the assistance and support of the Alberta Emergency Response Management Agency.

Health Effects

The Board agrees that there are no expected acute or chronic health effects at ground level or fenceline for the formaldehyde plant or for the cumulative case. The Board reiterates its view, set out earlier with respect to "air issues" and supported with a condition, that early validation of modeled ambient conditions is necessary.

Considering all predicted impacts, the Board concludes that the Arclin proposal meets the Board's statutory public interest test. The proposed facility will benefit the Town of Sexsmith and surrounding area without corresponding negative social impacts. With respect to two key related issues of concern, air emissions and health effects, data provided by Arclin convincingly demonstrate that expected emissions fall well under Alberta Ambient Air Quality Objectives and that there are no acute or chronic health effects expected as a result of those emissions. Assessment and monitoring proposed by Arclin, and supplemented by Board conditions, will add to the data available to Arclin and the regulators in their ongoing management and oversight of the facility. An Emergency Response Plan, developed specifically for the Arclin plant, and in place before the start-up of Phase III, will provide Arclin and municipal authorities with a proactive tool to deal with any events and emergencies.

6.3: Conclusion

Based on its assessment of the information before it, the Board finds that the proposed Arclin formaldehyde project is in the public interest for the reasons set out above, subject to the commitments and undertakings provided by Arclin, and the conditions imposed by the Board in this decision.

DATED at CALGARY, ALBERTA, this ___ day of September, 2008.

Original signed by:

Vern Hartwell, Chair

Jim Turner

Donna Tingley

APPENDIX A:

THE PROVINCE OF ALBERTA
NATURAL RESOURCES CONSERVATION BOARD ACT
NATURAL RESOURCES CONSERVATION BOARD

IN THE MATTER of a project of Arclin Canada Ltd. for approval to construct and operate a formaldehyde manufacturing plant in Sexsmith, Alberta

APPROVAL NO. NR–2008-2

WHEREAS the Lieutenant Governor in Council, on the recommendation of the Minister of Environment, pursuant to section 4(f) of the Natural Resources Conservation Board Act, prescribed as a reviewable project the Formaldehyde Manufacturing Plant proposed by Arclin Canada Ltd. (formerly Dynea Canada Ltd.) to be located on 24-73-6-W6M in Sexsmith, Alberta; and

WHEREAS the Natural Resources Conservation Board is prepared to grant approval to the application by Arclin Canada Ltd., subject to the conditions herein contained, and the Lieutenant Governor in Council has given authorization, hereto attached.

THEREFORE, the Natural Resources Conservation Board hereby orders as follows:

1. The project of Arclin Canada Ltd., for construction and operation of a formaldehyde manufacturing plant located in Sexsmith, as described in Application No. 0701, from Arclin Canada Ltd. to the Board filed April 2, 2007 and all supplemental material supporting the Application filed with the Natural Resources Conservation Board, is approved, subject to the undertakings and commitments in the application and the terms and conditions herein contained.

2. Arclin Canada Ltd. shall, to the satisfaction of Alberta Environment, implement a fugitive emissions control and detection program in accordance with applicable sections of the CCME Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions (1993 or latest update).

3. Arclin Canada Ltd. shall ensure the maximum ground level concentrations at the facility should not exceed Alberta's Ambient Air Quality Objectives at all times, including downtime, and any exceedences must be reported to Alberta Environment for appropriate follow-up.

4. Arclin Canada Ltd. shall conduct ambient air monitoring every two months for the first six months of operation of the formaldehyde plant and report the results to Alberta Environment.

5. Arclin Canada Ltd. shall work with Alberta Environment to ensure that placement of any monitoring wells near the formaldehyde plant will be such that at least one monitoring well will be located down gradient of the plant and will be able to adequately detect any impacts on shallow groundwater that may originate from the plant.

6. Arclin Canada Ltd. shall, to the satisfaction of Alberta Environment, plan and implement a baseline assessment of the surface water quality in the local study area prior to the start-up of operations.

7. Arclin Canada Ltd. shall, to the satisfaction of Alberta Environment, conduct field surveys for amphibians and birds prior to the issuance of an *Environmental Protection and Enhancement Act* approval from Alberta Environment. Further, Arclin Canada Ltd. is required to address any mitigative actions required as a result of the surveys to the satisfaction of Alberta Environment.

8. Arclin Canada Ltd. shall develop an emergency response plan satisfactory to the Town of Sexsmith prior to the start-up of Phase III, and shall update the emergency response plan to the satisfaction of the Town of Sexsmith within six months of Phase II start-up.

Made at the City of Calgary, in the Province of Alberta, this _____ day of _____, 2008.

NATURAL RESOURCES CONSERVATION BOARD

_____ _____

Vern Hartwell, Chair **Jim Turner**

_____

Donna Tingley

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Copies of the NRCB Act, Rules of Practice of the Natural Resources Conservation Board Regulation and the Administrative Procedures Act are available through Queen's Printer. NRCB Guides are available by contacting the NRCB's Edmonton office.

ISBN 978-0-7785-7751-5

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